I Claim:

1. A method of forming a three dimensional object, comprising:

(a) providing an array of controllable pixel elements;

(b) providing a container having a medium therein capable of selective curing upon application of a stimulus;

(c) providing a window coupled with the container, such that the medium is operatively positioned with respect to at least one surface of the window;

(d) providing a source of the stimulus;

(e) directing the stimulus and the array of pixel elements, such that a portion of the stimulus travels through the window of the container, wherein select regions of the medium are cured;

(f) displacing the cured select regions of the layer with respect to the surface of the window, such that a gap is formed between the window and the cured layer, and wherein additional uncured medium fills the gap;

(g) repeating (e) and (f) until a final layer is to be formed; and

(f) repeating (e) to form the final layer.

2. The method of claim 1, wherein the array of controllable pixel elements comprises a spatial light modulator.

3. The method of claim 2, wherein the spatial light modulator comprises a plurality of mirrored surfaces each independently pivotable from a first to a second position.

4. The method of claim 1, wherein the medium comprises a photo curable resin.

5. The method of claim 1, further comprising preventing a portion of the layer adjacent the window from curing, such that the cured layer is displaced from the window without the use of a damaging force.

6. The method of claim 5, wherein the window further includes a separation agent on the at least one surface of the window to prevent a portion of the layer adjacent the window from curing.

7. The method of claim 6, wherein the separation agent comprises a halogenated compound.

8. The method of claim 1, further comprising allowing for a change in volume of the medium when the cured layer is displaced away from the window.

9. The method of claim 8, wherein an opening between the container and the window allows for a change in volume of the medium.

10. The method of claim 1, wherein the source of the stimulus comprises a radiant energy source capable of being reflected by the array of controllable pixel elements.

11. The method of claim 1, further comprising increasing the size of an image formed by each pixel element.

12. The method of claim 11, wherein at least one lens through which the stimulus passes before entering into the medium increases the size of the image.

13. The method of claim 1, further comprising decreasing the size of an image formed by each pixel element.

14. The method of claim 13, wherein at least one lens through which the stimulus passes before entering into the medium decreases the size of the image.

15. The method of claim 14, wherein the image produced by the at least one lens has a resolution of approximately 1 micron by 1 micron.

16. The method of claim 1, further comprising:

turning each of the plurality of pixel elements either ON or OFF, such that pixel elements turned ON reflect the stimulus into the medium, and pixel elements turned OFF deflect the stimulus away from the medium.

17. The method of claim 16, wherein a computer control system determines which pixel elements are turned ON or OFF.

18. The method of claim 1, wherein displacing the cured select regions of the layer away from the surface of the window further comprises:

providing an elevator platform upon which the cured layer rests; and

lowering the elevator platform following curing of the select regions of the layer.

19. The method of claim 1, wherein displacing the cured select regions of the layer with respect to the surface of the window further comprises:

providing an elevator platform having a target platform attached thereto, wherein the three dimensional object being formed adheres to the target platform; and

raising elevator platform away from the window.

20. The method of claim 19, wherein the window is substantially at the bottom of the container.

21. The method of claim 19, wherein the container further includes a recess within a base of the container.

22. The method of claim 21, wherein the window is mounted within the recess.

23. The method of claim 19, further comprising directing the stimulus through the window within the recess of the container.

24. A method of forming a three dimensional object, comprising:

providing at least one spatial light modulator, having a plurality of controlled pixel elements;

providing a container having a medium therein and a window within the container, wherein the medium is operatively positioned with respect to at least one surface of the window;

providing a source of stimulus;

iterating for i=1, 2, ..., M, wherein M is the maximum number of layers to be formed, and wherein iteration I comprises:

if $i \leq M$, directing the stimulus and the pixel elements of the spatial light modulator, such that select pixel elements reflect the stimulus, directing the stimulus into an i^{th} layer of the medium, wherein select regions of the i^{th} layer are cured;

if $i < M$, moving the cured i^{th} layer with respect to the window, such that a gap is formed between the window and the cured i^{th} layer, wherein the uncured medium fills the gap; and

ending iteration i.

25. The method of claim 24, further comprising lowering the cured i^{th} layer away from the window.

26. The method of claim 25, wherein the window is mounted above the medium.

27. The method of claim 24, further comprising raising the cured i^{th} layer away from the window.

28. The method of claim 27, wherein the window is mounted substantially below the medium.

29. The method of claim 24, wherein the spatial light modulator comprises a plurality of mirrored surfaces each independently pivotable from a first to a second position.

30. The method of claim 24, further comprising removing the three dimensional object from the container following the M^{th} iteration.

31. The method of claim 24, further comprising reducing a size of an image projected from the pixel elements into the uncured i^{th} layer.

32. The method of claim 31, wherein a lens between the pixel elements and the medium reduces the size of the image.

33. The method of claim 31, wherein the image projected is approximately 1 micron by 1 micron.

34. The method of claim 24, further comprising preventing a portion of the i^{th} layer adjacent the window from adhering to the window.

35. The method of claim 34, wherein a separation agent on an at least one surface of the window prevents the portion of the i^{th} layer adjacent the window from adhering to the window.

36. An apparatus for forming a three dimensional object, comprising:

a container having a selectively curable medium therein;

a window coupled with the container, wherein the selectively curable medium is operatively positioned with respect to at least one surface of the window;

a source of stimulus, such that the stimulus is capable of curing the selectively curable medium;

a controllable array of pixel elements capable of selectively projecting the stimulus through the window to a layer of the selectively curable medium; and

a device capable of displacing a cured quantity of the selectively curable medium with respect to the window.

37. The apparatus of claim 36, further comprising:

at least one lens between the array of pixel elements and the curable medium.

38. The apparatus of claim 37, wherein the at least one lens increases an image projected into the layer of selectively curable medium.

39. The apparatus of claim 37, wherein the at least one lens decreases an image projected into the layer of selectively curable medium.

40. The apparatus of claim 39, wherein the projected image is approximately 1 micron by 1 micron.

41. The apparatus of claim 36, wherein the window further comprises a separation agent on a surface contacting the selectively curable medium.

42. The apparatus of claim 41, wherein the separation agent comprises a halogenated compound.

43. The apparatus of claim 36, wherein the window is mounted substantially near a top of the container.

44. The apparatus of claim 36, wherein the window is mounted substantially near a bottom of the container.

45. The apparatus of claim 36, wherein the window is mounted within a recess of the container.

46. The apparatus of claim 36, further including an opening between the window and the container.

47. The apparatus of claim 36, wherein the device capable of displacing a cured quantity comprises an elevator platform.

48. The apparatus of claim 47, wherein the elevator platform further includes a target platform.

49. The apparatus of claim 48, wherein the target platform is mounted to the elevator platform between the elevator platform and the window.

50. The apparatus of claim 48, wherein a first cured layer adheres to a surface of the target platform.

51. The method of claim 36, wherein the controllable array of pixel elements comprises a plurality of mirrored surfaces each independently pivotable from a first to a second position.